

portion at a second end;

a central bore extending from the first end to the second end;

a mixing cavity defined by the downstream portion;

a high pressure cavity defined by the upstream portion having a generally cylindrical side wall and a bottom wall generally normal to the axis of the central bore wherein a transition portion between the side wall and the bottom wall has a generally quarter circle curvilinear sectional profile to provide a constant radius transition between the side wall and the bottom wall; and

an abrasive material inlet bore leading to the mixing cavity.

3. The assembly of claim 2 wherein the bottom wall and transition portion between the side wall and the bottom wall are formed by a removable orifice body having an upstream end mated to the side wall and having a downstream end.

4. The assembly of claim 2 further comprising a mixing tube downstream of the mixing cavity wherein the mixing tube has a frustoconical upstream wall and a cylindrical downstream wall.

5. The assembly of claim 2 wherein the high pressure cavity bottom wall has a recess formed therein to receive a jewel having an orifice coaxial with the bore.

6. The assembly of claim 2 wherein a seal recess is formed in the first end of the nozzle assembly.

7. The assembly of claim 6 wherein the seal recess is annular and coaxial with the bore.

8. The assembly of claim 7 further comprising a resilient seal disposed in the seal recess.

9. The assembly of claim 3 further comprising a mixing tube wherein the

downstream end of the orifice body defines a frustoconical recess coaxial with the bore to receive and align the mixing tube.

10. The assembly of claim 3 wherein a mixing tube is mated to a down stream portion of the orifice body such that the mixing tube has an axis that is coaxial with the axis of the central bore, and the orifice is formed by a jewel disposed at the bottom wall for forming a precise column of pressurized fluid.

11. An assembly for use as a high pressure fluid jet cutting nozzle comprising:

a nozzle body having an upstream portion at a first end, a downstream portion at a second end, a middle portion between the upstream portion and the downstream portion, and an axis;

a first bore extending from the first end to the second end, generally parallel to the axis;

a mixing cavity in the middle portion communicating with the first bore;

a second bore defined by the nozzle body for introducing abrasive material into the mixing cavity,

the downstream portion including a mixing tube having an upstream end and a downstream end, the mixing tube being coaxial with the first bore and downstream of the mixing cavity, and

a cylindrical nozzle guard coaxial with and encircling the mixing tube and extending downstream as far as the downstream end of the mixing tube.

12. The assembly of claim 11 wherein the second bore has an axis and the axis is not parallel with the nozzle body axis.

13. The assembly of claim 11 wherein the second bore is in direct communication

with the mixing cavity.

A1  
14. The assembly of claim 11 wherein the first bore is in communication with a high pressure cavity defined by the upstream portion having a generally cylindrical side wall and a bottom wall generally normal to the axis of the nozzle body wherein a transition portion between the side wall and the bottom wall has a generally quarter circle curvilinear sectional profile to provide a constant radius transition between the side wall and the bottom wall.

15. (cancelled)

16. The assembly of claim 11 further comprising a jewel defining an orifice coaxial with the nozzle body axis located upstream of the mixing cavity.

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17. The assembly of claim 16 wherein the upstream portion of the nozzle body defines a high pressure cavity and the jewel is disposed in a recess in a bottom wall of the high pressure cavity.

18. The assembly of claim 17 further comprising a soft seal adjacent an opening of the high pressure cavity to provide a sealing means between the assembly and an inlet body.

19. The assembly of claim 11 further comprising a soft seal located at the upstream portion of the nozzle body to provide a sealing means between the assembly and an inlet body.

The following redline version of the claims shows all of the requested changes to the claims:

1. ~~(cancelled) An orifice assembly for use with a high pressure fluid jet cutting~~

nozzle comprising:

- ~~\_\_\_\_\_ an orifice body having an upstream portion at a first end and a downstream portion at a second end;~~
- ~~\_\_\_\_\_ a central bore extending from the first end to the second end;~~
- ~~\_\_\_\_\_ a mixing cavity defined by the downstream portion; and~~
- ~~\_\_\_\_\_ a high pressure cavity defined by the upstream portion having a generally cylindrical side wall and a bottom wall generally normal to the axis of the central bore wherein a transition portion between the side wall and the bottom wall has a generally quarter circle curvilinear sectional profile to provide a constant radius transition between the side wall and the bottom wall.~~

2. An assembly for use as a high pressure fluid jet cutting nozzle comprising:

- \_\_\_\_\_ a nozzle assembly having an upstream portion at a first end and a downstream portion at a second end;
- \_\_\_\_\_ a central bore extending from the first end to the second end;
- \_\_\_\_\_ a mixing cavity defined by the downstream portion;
- \_\_\_\_\_ a high pressure cavity defined by the upstream portion having a generally cylindrical side wall and a bottom wall generally normal to the axis of the central bore wherein a transition portion between the side wall and the bottom wall has a generally quarter circle curvilinear sectional profile to provide a constant radius transition between the side wall and the bottom wall; and

\_\_\_\_\_ The orifice assembly of claim 1 further comprising an abrasive material inlet bore leading to the mixing cavity.

3. The orifice assembly of claim 2 wherein the high pressure cavity has a generally cylindrical side wall and a generally rectilinear bottom wall and transition portion

between the side wall and the bottom wall are formed by a removable orifice body having an upstream end mated to the side wall and having a downstream end.

4. The ~~orifice assembly~~ of claim 2 further comprising a mixing tube downstream of the mixing cavity wherein the mixing cavity tube has a frustoconical upstream wall and a cylindrical downstream wall.

5. The ~~orifice assembly~~ of claim 2 wherein the high pressure cavity bottom wall has a recess formed therein to receive a ~~jewel body~~ having an orifice coaxial with the bore.

6. The ~~orifice assembly~~ of claim 2 wherein a seal recess is formed in the first end of the ~~nozzle assembly~~ ~~orifice body~~.

7. The ~~orifice assembly~~ of claim 6 wherein the seal recess is annular and coaxial with the bore.

8. The ~~orifice assembly~~ of claim 7 further comprising a resilient seal disposed in the seal recess.

9. The ~~orifice assembly~~ of claim 23 ~~wherein~~ further comprising a mixing tube wherein the second downstream end of the orifice body defines a frustoconical recess coaxial with the bore to receive and align a the mixing tube.

10. The ~~orifice assembly~~ of claim 1-3 ~~further comprising a~~ wherein a mixing tube is mated to the a down stream portion of the orifice body wherein such that the mixing tube has an axis that is coaxial with the axis of the central bore, and the orifice is formed by a jewel disposed at the bottom wall for forming a precise column of pressurized fluid.

11. An ~~orifice assembly~~ for use with ~~as a~~ high pressure fluid jet cutting nozzle comprising:

an orifice nozzle body having an upstream portion at a first end, a downstream portion at a second end, a middle portion between the upstream portion and the

downstream portion, and an axis;

a first bore extending from the first end to the second end, generally parallel to the axis;

a mixing cavity in the middle portion communicating with the first bore and defined by the downstream portion; and

a second bore defined by the ~~orifice~~ nozzle body for introducing abrasive material into the mixing cavity,

the downstream portion including a mixing tube having an upstream end and a downstream end, the mixing tube being coaxial with the first bore and downstream of the mixing cavity, and

a cylindrical nozzle guard coaxial with and encircling the mixing tube and extending downstream as far as the downstream end of the mixing tube.

12. The ~~orifice~~ assembly of claim 11 wherein the second bore has an axis and the axis is not parallel with the ~~orifice~~ nozzle body axis.

13. The ~~orifice~~ assembly of claim 11 wherein the second bore is in direct communication with the mixing cavity.

14. The ~~orifice~~ assembly of claim 11 wherein the first bore is in communication with a high pressure cavity defined by the upstream portion having a generally cylindrical side wall and a bottom wall generally normal to the axis of the nozzle ~~orifice~~ body wherein a transition portion between the side wall and the bottom wall has a generally quarter circle curvilinear sectional profile to provide a constant radius transition between the side wall and the bottom wall.

15. ~~(cancelled) The orifice assembly of claim 11 further comprising a mixing tube positioned adjacent to the mixing chamber wherein the mixing tube has an axis coaxial with the first bore, and a nozzle body concentrically surrounding the orifice assembly~~